a computer code that informs an FFT generator of the first time slot and of the second time slot;

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a computer code that generates one or more FFT measurements of an upstream spectrum during the first time slot when the cable modem can transmit upstream and the second time slot when no cable modem on the network is transmitting upstream;

a computer code that compares FFT measurements of the first time slot with FFT measurements of the second time slot thereby detecting undesirable noise created by the cable modem; and

a computer-readable medium that stores the computer codes.

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32. (Amended) A computer program product for detecting faulty modems in a network employing multiple channels, separated in frequency to allow modems to transmit data, the computer program product comprising:

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a computer code that compares, for a selected modem transmitting data in a frequency channel, extra-channel noise outside the frequency channel when the selected modem is transmitting data with a noise floor outside the frequency channel when neither the selected modem nor any other modem on the network is transmitting data;

a computer code that disables the selected modem if the difference between the extra-channel noise when the selected modem is transmitting and when the selected modem is not transmitting is greater than a predetermined threshold; and

a computer-readable medium that stores the computer codes.

REMARKS

Claims 1-32 are pending in the application. Amendments to claims 1, 15, 21, 27, 31, and 32 have submitted for entry after final. These amendments include definitional language inserted to address issues raised by the Examiner. Support for the claim amendments is found generally at page 17, line 10 - page 19, line 16 of the present specification referring to FIG. 3.

It is respectfully submitted that the claim amendments raise no new issues and would simplify issues for appeal. The material added by amendment was inherently present in the originally submitted claims. Thus, these amendments are not believed to narrow the claim scope

as compared to the original claims, or raise new issues which would require further consideration and/or search. Favorable reconsideration of the application, as amended, is respectfully requested.

I. REJECTIONS OF CLAIMS 1-32 UNDER 35 U.S.C. § 103

Claims 1-32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,926,479 ("Baran") in view of U.S. Patent No. 5,832,032 ("Overbury"). Withdrawal of the rejections is respectfully requested.

As a preliminary matter, it is respectfully submitted that the Examiner has taken liberties with the teachings of the references and the meanings of the claim terms. Applicants believe, for example, that the Examiner's position regarding Baran's buffer system in Fig. 3a goes well beyond the implicit or inherent teachings of the reference. The Examiner asserts that Baran's buffer system suggests assigning or reserving time slots for measuring upstream spectra. As explained below, it is respectfully submitted that this is not a legally acceptable extrapolation of Baran's description. As another example, the Examiner cites Overbury's "weight" control signal as suggesting "disabling the selected modem." The Overbury patent makes no mention of using a weight to disable a modem, and it is respectfully submitted that one skilled in the art would not find a suggestion in Overbury to provide a "weight" control signal in a regime that entirely disables a network device. Overbury's goal is to cancel interference by phase shifting and summing, not by disabling network devices.

In making an obviousness rejection, it is important to consider what the references reasonably teach. MPEP 2143.01. It is respectfully submitted that it is not reasonable to use the references for what might be technically feasible but what is not suggested in the reference.

The Claimed Invention and the Cited References

Some of the pending claims pertain to modems on a network where the individual modems are allowed to transmit upstream only in separate time slots. Often time slot allocation is administered by a "cable modem termination system" (CMTS) responsible for the entire network of cable modems, which may number into the many thousands. Regardless of whether specific time slots are allocated for upstream transmissions, the claimed invention requires a method, apparatus, or computer program product that compares upstream FFT measurements or noise measurements at one time when a potentially faulty modem is transmitting upstream and at another time when no modem is transmitting upstream.

Independent claim 1 recites "assigning a first time slot to the cable modem in which the cable modem can transmit data upstream," and "reserving a second time slot, unassigned to any cable modem on the cable modem network for transmitting data upstream." At each of these time slots, the method generates FFT measurements for comparison with each other. Independent claims 15, 21, 27, 31, and 32 contain related recitations of the FFT/noise measurements generated at times when the modem in question is transmitting and when no modem is transmitting.

In the Office Action, the Examiner asserts that the buffers 80 and 81 in Fig. 3a of Baran (paragraphs 9 and 10), transfer of data between the registers A and B in Fig. 12a of Baran (paragraph 25), or the RX signal curve in Fig. 2 of Overbury (paragraph 36) suggests the FFT measurements (claims 1, 15, 21, and 31) or the noise measurement (claims 27 and 32) at the first and second time slots. It is respectfully submitted that the cited technical features described in the prior art references would not reasonably suggest any of the claimed features.

Fundamentally, nothing in the prior art references suggests making FFT/noise measurements at two different times, one associated with a modem transmission and one associated with no the modem transmission. Baran states that data received from an originating unit (108, 62 or 601) in the corresponding buffer (81, 81', or 81") is transferred via bus 74 to a transmit buffer 80, 80', or 80" associated with a receiving unit (108, 62 or 601) (column 7, lines 5-9). According to the Examiner, these data transfers between buffers in the Baran system somehow constitute assigning and reserving time slots (or otherwise allotting different times, one associated with upstream modem transmission and the other not so associated). It appears that the Examiner believes that the Baran's microcontroller inherently sets aside time for filing Baran's upstream cable modem buffer 80 and other times for not filing that buffer. These times, inherently read into the Baran patent by the Examiner, allegedly correspond to the times or time slots recited in the claims.

Merely filling a buffer with data as Baran describes does not suggest in "assigning a first time slot to a cable modem in which the cable modem transmitting data upstream." As illustrated in Fig. 3a of Baran, the buffers 80 and 81 are not directly connected with upstream transmissions from modem 108. It is not even clear that these individual buffers are part of the modem 108. Regardless, it is appears from Baran's overall description that a "controls buffer" 112 would most likely control upstream data transmission. As a result, writing to/reading from the buffers 80 and 81 does not necessarily coincide with the actual transmitting data upstream. It is respectfully submitted that nothing in Baran suggests assigning or reserving time slots (or any other representation of separate times) for modem transmissions and no modem transmissions.

In paragraph 25, the Examiner asserts that the data transfer between the registers A and B of Baran teaches the "predetermined times" recited in claim 15. However, as indicated in Fig.

12a, the registers A and B certainly are not cable modems. The registers A and B are coupled to the microprocessors A and B, respectively (Fig. 12a). The microprocessors A and B are included in the packetizing processor 204 and the TV cable side unit 202, respectively (column 11, lines 33-44). The packetizing processor 204 and the TV cable side unit 202 are included in the T1 terminator unit 51 which interfaces the cable 16 and the signal lines 52 and 53 (column 7, lines 18-30; Figs. 2, 5a and 5b). On the other hand, the TV cable modem 108 is provided within the SIU 14 (column 5, line 53 - column 6, line 16). As a result, the registers A and B are included in the T1 terminator unit 51 while the TV cable modem 108 is included in the SIU 14, which is a separate component different from the T1 unit 51. Therefore, the registers A and B are in no way associated with a cable modem. Thus, the cited portions of Baran are not relevant to the claimed features.

In summary, neither reference suggests using two separate times for making upstream FFT/noise measurements. Nor does either reference suggest that one time be used for upstream transmission by a modem and the other time be reserved for no upstream transmission. Nor does either reference suggest that FFT/noise measurements made at two separate times should be compared. Hence it is respectfully submitted that is legally impermissible to conclude that any combination of the references meets the claim requirement that FFT/noise measurements be made at separate times (one when the modem is transmitting upstream and one when no modem is transmitting) for comparison. For at least this reason, it is respectfully submitted that the invention of claims 1, 15, 21, 27, 31, and 32 (and their dependent claims) is patentable over the cited references.

The Examiner argues, citing case law, that the test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art. Any asserted suggestions must be *reasonable* to one of skill. Further, in order for an invention to be obvious, there must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. Here, even assuming *arguendo* that Baran shows the claimed first and second time slots, neither Baran nor Overbury teaches or suggests how these time slots are tied with the FFT measurements or noise as claimed. In other words, nothing in the references motivates those skilled in the art to generate FFT measurements/noise at those recited times or time slots, e.g., the first and second time slots. Overbury merely shows interference cancellation without using any time slots specifically assigned to a cable modem or unassigned to any cable modem. Even with the combined teachings of Baran and Overbury, those skilled in the art would not find a reason for generating FFT/noise level measurements at the recited times or time slots because Baran and Overbury are completely silent on any the relationship between FFT/noise measurements at specific times or time slots. Nothing in Baran and Overbury suggests when to generate FFT

measurements. Therefore, it would not have been obvious to combine the references. Thus, the invention defined in claims 1, 15, 21, 27, 31, and 32 is patentable over Baran and Overbury.

Regarding claims 1 and 31, paragraph 11 of the Office Action states that Baran shows "informing an FFT generator of the first time slot and of the second time slot" as recited in claim 1. The Examiner specifically refers to the microcontroller 73 which controls the buffers 80/81 via the bus 74 in Fig. 3a. However, nothing explicitly, implicitly, or inherently in Baran shows informing a generator of times or time slots associated with upstream transmission. If the Examiner believes that this is somehow implicit in Baran, he must do a much better job of spelling out the technical details.

And, the mere fact that Overbury shows an FFT unit does not suggest informing an FFT generator of the specific time slots recited in claims 1 and 31. It requires more than a mere possibility to support an obviousness rejection. It is respectfully that claims 1 and 31 are patentable over the references for this reason, as well.

In paragraph 22 of the Office Action, the Examiner alleges that the last full paragraph of column 12 of Baran shows "generating one or more FFT measurements of an upstream spectrum during the first time slot and the second time slot" as recited in claims 1 and 31. This portion mentions that signals can be processed with fast Fourier transforms for interfacing with multiple terminals at different frequencies. In other words, the cited portion of Baran merely suggests signal processing by FFT by a conventional manner. It simply does not teach or suggest generating FFT measurements of an upstream spectrum at the time slots as specified in the claims. Thus, general description of FFT signal processing cannot be used for asserting that the specific claimed features are disclosed in the reference. Claims 1 and 31 are patentable over the references in this regard, as well.

Regarding claim 27, the Examiner states at paragraph 36 of the Office Action that the weight control signal 89 may adjust the weights 90 for "disabling the selected modem." However, it is respectfully submitted that this is not correct because the weight control signal 89 controls the signal processors 84 and 86, which are not modems. Overbury simply does not describe any modem function in the processors 84 and 86. See, column 5, lines 34-40. The function of Overbury's weight control signal is to scale and shift a one signal so that it can be combined with a different signal to cancel interference. See, column 5, lines 26-33. Nothing in Overbury suggests disabling a modem. Overbury instead desires to remove noise by canceling it, not by disabling a problematic modem. Thus, claim 27 is patentable over the references in this regard, too.

Further in paragraph 36 of the Office Action states that the RX signal curve in Fig. 2 of Overbury suggests the extra-channel noise of a selected cable modem as recited in claim 27.

However, nothing in the Overbury reference suggests that the curve RX represents noise. On the contrary, Overbury characterizes the curve RX as "signal," in distinction from the "noise" represented in the lower curve of Fig. 2. Therefore, the cited references do not negate patentability of claim 27 on its dependent claims.

For at least the reasons set forth above, combination of Baran and Overbury fail to teach or suggest the features recited in claims 1, 15, 21, 27, 31, and 32. Accordingly, the Office Action does not set forth a prima facie case of obviousness for at least claims 1, 15, 21, 27, 31, and 32. Claims 2-14, 16-20, 22-26, and 28-30 dependent, either directly or indirectly, from one of claims 1, 15, 21, 27, 31, and 32 are also believed to be allowable for at least the same reasons set forth above in connection with the independent claims. Accordingly, withdrawal of the rejections to claims 1-32 is respectfully requested.

II. CONCLUSION

Applicants believe that all pending claims are in condition for allowance, and respectfully requests a Notice of Allowance at an early date. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 510-843-6200.

Respectfully submitted,
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/- 幡 晴 夫

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APPENDIX – VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1, 15, 21, 27, 31, and 32 have been amended as follows:

1. (Amended) A method of detecting upstream signal transmission quality of a cable modem on a cable modem network having a plurality of cable modems, the method comprising:

assigning a first time slot to the cable modem in which the cable modem can transmit data upstream;

reserving a second time slot for transmitting data upstream, unassigned to [a particular] any cable modem on the cable modem network;

informing an FFT generator of the first time slot and of the second time slot;

generating one or more FFT measurements of an upstream spectrum during the first time slot when the cable modem can transmit upstream and the second time slot when no cable modem on the network is transmitting upstream; and

comparing FFT measurements of the first time slot with FFT measurements of the second time slot thereby detecting undesirable noise created by the cable modem.

15. (Twice Amended) A cable modem termination system (CMTS) which can issue time slots for upstream transmission by individual cable modems on a cable modem network having a plurality of cable modems, the CMTS capable of detecting faulty cable modems, the CMTS comprising:

an upstream receiver and demodulator capable of receiving an upstream signal;

a Fast Fourier Transform (FFT) engine capable of performing FFT measurements on the upstream signal and storing the FFT measurements; and

a processor for performing computations on the FFT measurements and communicating data, wherein the data relates to noise levels of the upstream signal at predetermined times, wherein the predetermined times correspond to

a first time when a cable modem is transmitting data upstream, and

a second time when no data is being transmitted upstream.

21. (Amended) A method of detecting a faulty cable modem in a cable television plant having a plurality of cable modems, the method comprising:

taking a first FFT measurement of an upstream spectrum, creating a first frequency-power spectrum, at a time when a cable modem is transmitting data upstream;

taking a second FFT measurement of the upstream spectrum, creating a second frequency-power spectrum, at a time when no data is being transmitted upstream by any of the plurality of cable modems in the cable television plant;

calculating a power-difference between the first FFT measurement and the second FFT measurement; and

utilizing the power-difference to determine whether the cable modem is faulty.

27. (Amended) A method of detecting faulty modems in a network employing multiple channels, separated in frequency to allow modems to transmit data, the method comprising:

for a selected modem transmitting data in a frequency channel, comparing extra-channel noise outside the frequency channel when it is transmitting data with a noise floor outside the frequency channel when neither the [select] selected modem [is not] nor any other modem on the network is transmitting data; and

if the difference between the extra-channel noise when the modem is transmitting and when the modem is not transmitting is greater than a predetermined threshold, disabling the selected modem.

31. (Amended) A computer program product for detecting upstream signal transmission quality of a cable modem on a cable modem network having a plurality of cable modems, the computer program product comprising:

a computer code that assigns a first time slot to the cable modem in which the cable modem can transmit data upstream;

a computer code for transmitting data upstream that creates a second time slot, unassigned to [a particular] any cable modem on the cable modem network;

a computer code that informs an FFT generator of the first time slot and of the second time slot;

a computer code that generates one or more FFT measurements of an upstream spectrum during the first time slot when the cable modem can transmit upstream and the second time slot when no cable modem on the network is transmitting upstream;

a computer code that compares FFT measurements of the first time slot with FFT measurements of the second time slot thereby detecting undesirable noise created by the cable modem; and

a computer-readable medium that stores the computer codes.

32. (Amended) A computer program product for detecting faulty modems in a network employing multiple channels, separated in frequency to allow modems to transmit data, the computer program product comprising:

a computer code that compares, for a selected modem transmitting data in a frequency channel, extra-channel noise outside the frequency channel when the selected modem is transmitting data with a noise floor outside the frequency channel when neither the selected modem [is not] nor any other modem on the network is transmitting data;

a computer code that disables the selected modem if the difference between the extra-channel noise when the selected modem is transmitting and when the selected modem is not transmitting is greater than a predetermined threshold; and

a computer-readable medium that stores the computer codes.

BEFORE THE OFFICE OF ENROLLMENT AND DISCIPLINE
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